
Early Mobilization in an Oncology Intensive Care Unit

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Abstract: Introduction: Quality of life and functionality of critically ill cancer patients are significantly affected after ICU admission, with changes due to immobility, hemodynamic instability, muscular atrophy, cognitive deficits, psychological difficulties, decreased cardiovascular functional capacity, neurological deleterious effects on the respiratory system. The physiotherapeutic intervention is effective in preventing and reducing the deleterious dysfunctions of immobility, as well as improving the quality of life of the patient during his / her stay in the ICU. Objective: To carry out a systematic review of literature seeking the benefits of early mobilization in intensive care patients. Methodology: Refers to a systematic literature review, approaching the PRISMA methodology, with two independent examiners who analyzed the quality of the study. We selected as inclusion criteria articles in Portuguese, English and Spanish that refer to the topic of early mobilization in intensive care oncology. Documents that do not associate with the proposed theme were excluded from the search. The articles were searched in the databases: VHL, PUBMED, COCHRANE, PEDRO and EBSCO. Results: For the elaboration of the study, 66 articles were found in the total, where only 8 articles were used because they refer to the use of early mobilization in intensive oncologic therapy. Final considerations: Early mobilization in the ICU is essential in the intervention of the multidisciplinary team on the cognitive, physical and functional aspects along with the kinesiotherapeutic progressivity adequate to the individual needs of each patient, providing significant benefits in the prevention of dysfunctions caused by the immobilism syndrome, resulting in the best quality of life for the patient.

Keywords: Early Mobilization, Intensive Care Unit, Oncology

1. Introduction

Cancer patient has specific pathophysiological and clinical characteristics, most often needing support in the ICU sometime during disease progression, in order to bring therapeutic support to the patient in periods of greater severity or risk. According to the world health organization, cancer is the concept given to the set of diseases in which cells grow and spread wildly, can reach any part of the body. In 2018, presented a occurrence of more than 596 thousand cases of the disease in Brazil [1, 2].

In the ICU, critically ill patients who need to monitor and stabilize their hemodynamic condition are admitted in a sophisticated way, being possible a greater attention of the

multidisciplinary team [2]. Quality of life and functionality of critically ill cancer patients are considerably affected after ICU admission with alterations caused by immobility, hemodynamic instability, muscle atrophy, cognitive impairment, psychological difficulties, decreased cardiovascular, neurological alteration, deleterious effects on the respiratory system, functional decline, delirium and others [1, 2, 3].

Studies show that the occurrence of dysfunctions in the patient's homeostasis begins after 72 hours of admission to the ICU, and its consequences can last up to five years after hospital discharge, thus reducing the quality of life, generating a biopsychosocial imbalance and consequently generating a higher incidence of depression and anxiety [4].

The most favorable way for the prevention of these alterations is the physical therapy action through early mobilization in the ICU [5, 6].

Early mobilization consists of the initiation of physical therapy and cognitive activities in patients with mechanical ventilation within 48-72 hours of intubation onset, which begins with a multidisciplinary assessment to analyze the cognitive, physical and functional state of the patient, thus identifying and intervening according to the needs of each [1]. Activities such as stretching, positioning, use of the cycle ergometer, breathing exercises, assisted active exercises, transfer exercises, active range of motion exercises, bed mobility activities, walking, walking and others can be performed for a functional activity of the patient [1, 2, 6, 7, 8]. For early mobilization to be efficient, it is important to consider the type of exercise, the intensity, frequency, dose and duration, promoting a progressive kinesiotherapy according to the patient's evolution [2, 5, 7].

Often the patient may experience devastating fatigue, anxiety, fear, pain, boredom, insomnia (due to the turbulent environment), and most often lack motivation. This can have a negative impact on adherence to the therapist's proposed treatment, often becoming a reason for stopping early mobilization. The trust and involvement between therapist and patient is very important, as soon as you are able to establish this bond, it will begin to progress and evolve in the recovery stages, as time has come to realize and measure the functional gains that are being made [9].

The benefits of mobilization include decreased ICU stay, cardiopulmonary improvement, reduced fatigue symptoms, improved quality of life, increased muscle strength, weakness prevention, improved gastrointestinal function, pain control, decreased incidence of clot formation, pneumonia, promotion of clearance of secretions, pressure ulcers, also improving perfusion and muscle metabolism [1, 2, 3, 7, 9, 10, 11]. The

mobilization has been increasingly used as a non-pharmacological technique for pain relief, is associated with decreased sedation depth, with an excellent result, causing an increase in the number of days without mechanical ventilation. In addition, it decreases the time by 48 hours hospitalization, thus reducing hospital costs [5, 12]. Therefore, the physical therapy intervention is highly effective in preventing and reducing deleterious dysfunctions of immobility, as well as improving the patient's quality of life during their ICU stay, thus enhancing their rehabilitation in the post-hospitalization period [2, 5].

2. Methodology

Refers to a systematic literature review performed according to the PRISMA protocol (PreferredReportItems for SystematicReviewsand Meta-Analyses) with two independent examiners who assessed the quality of the study. In the first stage, searches were performed in five electronic databases: BVS, PUBMED, COCHRANE, PEDRO and EBSCO. The searches were performed in the English, Portuguese and Spanish languages, without starting date filter and until May 28, 2019. The search strategy given by the combination of the following keywords: "Early Mobilization, Intensive Care Unit, Oncology".

Then, there was a preliminary evaluation of titles and abstracts only, and duplicate articles that did not correspond to early mobilization in intensive cancer therapy were previously excluded. Later in the third stage, the selected studies were read in full and all those that met the inclusion criteria were included in this systematic review. Thus, any documents that do not associate with the proposed theme, and which are not of English, Portuguese or Spanish were excluded from the search (figure 1).

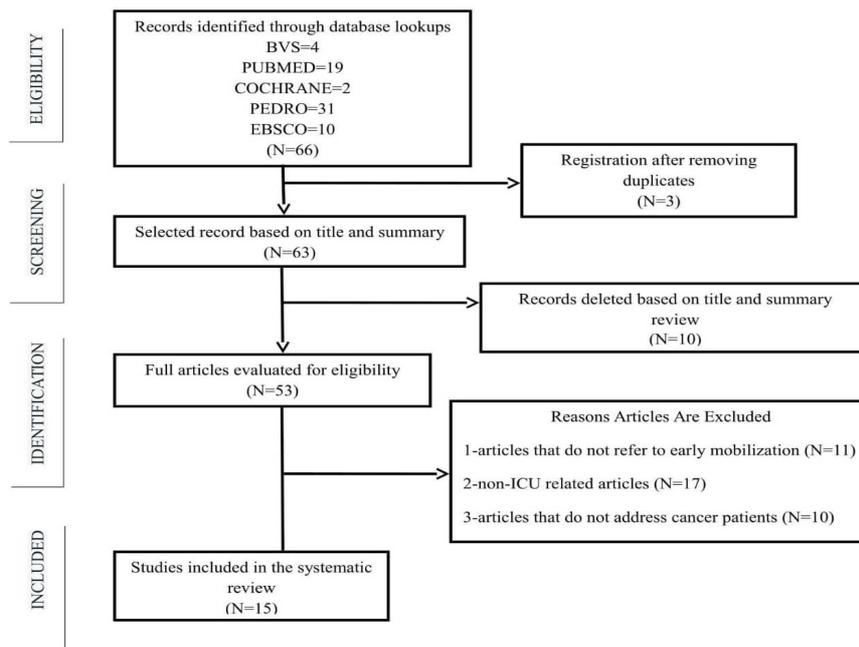


Figure 1. Schematic drawing of the applied methodology.

3. Results

To prepare the study, 66 articles were found, in which only 15 articles were used (Table 1), because they refer to the use of early mobilization in intensive cancer therapy.

Table 1. 15 articles used for article construction.

Search	Date	Author (es)	Objective	Method	Sample	Results
Is there a difference in early mobilization between mechanically ventilated clinical and surgical patients in the ICU?	2014	De Matos CA, De Meneses JB, Bucoski SCM, Mora CTR, Fréz AR, Daniel CR.	The objective was to verify if there is a difference in the parameters and outcomes of an early mobilization protocol among patients admitted to the ICU for clinical and surgical reasons	Retrospective study	We included individuals of both genders, over 18 years old, admitted to the general ICU from January to July 2013 and that made invasive MV use at some point in the hospital, regardless of the clinical diagnosis.	A general ICU with mobilization protocol differences were not observed in the early of active exercises when compared patients clinical and surgical. Although clinical patients sitting before, this did not significantly impact mortality or length of stay in the ICU. ICU daily practices show a tendency to withdraw early MV patients and keep them more active.
Functional evolution of critically ill patients undergoing early rehabilitation protocol	2015	Murakami FM, Yamguti WP, Onove MA, Mendes JM, Pedrosa RS, Maida ALV, De Salles ICD, De Brito CMM, Rodrigues MK.	To evaluate the functional evolution of patients undergoing an early rehabilitation protocol for critically ill patients from admission to discharge from the intensive care unit.	retrospective cross-sectional study	Data were collected retrospectively from the medical records of patients who met the inclusion criteria and who were admitted to the ICU from January 2012 to January 2013. Adult patients (aged over 18 years) were included, genders who had at least one risk factor for the development of ICU-acquired muscle weakness.	Of the 463 patients submitted to the protocol, 432 (93.3%) patients responded positively to the intervention strategy, maintaining and / or improving their initial functional status. Clinical patients classified as non-responders were older (74.3 ± 15.1 years; $p = 0.03$) and had a longer stay in the intensive care unit (11.6 ± 14.2 days; $p = 0.047$). and at the hospital (34.5 ± 34.1 days; $p = 0.002$).
Qualitative, Grounded Theory Exploration of Patients' Experience of Early Mobilisation, Rehabilitation and Recovery After Critical Illness	2019	Comer EJ, Murray EJ, Brett SJ.	Explore the patient's experience of physically critical illness rehabilitation during and after a stay in an intensive care unit (ICU).	Exploratory Study of Grounded Theory Using Semi-Structured Interviews	ICU survivors with acquired intensive care unit (ICUAW) weakness and an ICU stay > 72 hours	Fifteen people were interviewed (with four relatives present). The early rehabilitation period was characterized by episodic memory loss, hallucinations, weakness and fatigue, making early rehabilitation arduous and difficult to remember. Participants yearned for a paternalized process. Approach to care in the early days of the ICU. The central idea that emerged from this study was self recalibration. This is driven by a lost sense of self, with loss of autonomy and competence;
The Implementation and Evaluation of an Early Mobilization Program for Critically Ill Adult Oncology Patients	2010	Warren ML, Pravinkumar C, Frankel S, Nguyen V, Garcia B, Thomas M, Withers L, Nguyen Q, Brydges N.	Increase the average number of mobilization activities provided by a multidisciplinary team per patient per day by 40% after eight weeks of experience.	Estudo Transversal.	After eight weeks of EMP, the average total mobilization Activities per patient day increased by 47%. Mobilization activities carried out by The bed nursing staff increased by 31%. Mobilization activities carried out by physiotherapists and occupational therapists increased 86% and 78%, respectively.	The implementation of a multidisciplinary EMP in critically ill patients has led to a increase in the number of mobilization activities per patient day. Using an Alan Fields Award Winner: Practitioner with 2+ years of experience patient-centered approach, interdisciplinary team and quality improvement The process ensured the success and sustainability of the program.
A Descriptive Report of Early Mobilization for Critically Ill	2018	Weeks A, Campbell C, Rajendram P, Shi w, Voigt L.	Investigate feasibility of early mobilization and describe rehabilitation	Retrospective Review Study.	The study was conducted in a 20-bed medical / surgical ICU at a tertiary treatment center.	A cohort of 42 cancer patients on mechanical ventilation at the mixed / surgical hospital intensive care unit of a comprehensive

Search	Date	Author (es)	Objetive	Method	Sample	Results
Ventilated Patients with Cancer			interventions and discharge outcomes in a cohort of critically ill cancer patients.		the United States. Data were summarized through a retrospective cohort review of 42 records of patients who met the study criteria.	cancer center received early mobilization during study period. Most participants demonstrated better cognitive and functional status of the intensive care unit until hospital discharge.
Early Mobilization Programme Improves Functional Capacity After major Abdominal Cancer Surgery: A Randomized Controlled Trial	2017	De Almeida EPM, De Almeida JP, Landoni G, Galas FRBG, Fukushima JT, Fominskiy E, De Brito CMM, Cavichio LBL, De Almeida LAA, Osawa EA, Diz MPE, Cecatto RB, Battistella LR, Hajjar LA.	Evaluate the effectiveness, feasibility and safety of a supervised postoperative exercise program.	Randomized Study	Research of the University of São Paulo School of Medicine (Paulo, Brazil). Written informed consent was obtained from all patients or their legal substitute	All patients in the group were able to follow at least partially the exercise program, although the performance between them heterogeneous. There were no differences between groups regarding clinical outcomes or exercise-related complications.
Physiotherapy Led Early Rehabilitation Of The Patient With Critical Illness	2011	Thomas AJ.	Examine reports describing the effects of physical rehabilitation which is started immediately on intensive care admission compared to rehabilitation that is delayed.	Study Observational	Two hundred and twenty-five patients were admitted during the 5-month observation period but only 20 (9%) were enrolled in the early rehabilitation program.	Overall, early onset of rehabilitation shows increased incidence of physical therapy consultation, decreased time to reach activity goals, improved functional outcomes in intensive care unit and hospital discharge and reduce direct patient costs.
Enhanced Recovery Decreases Pulmonary and Cardiac Complications Following Thoracotomy for Lung Cancer	2018	Haren RMV, Mehran RJ, Correa AM, Antonoff MB, Baker CM, Woodard TC, Hofstetter WL, Mena GE, Roth JA, Sepesi B, Swisher SG, Vaporciyan AA, Walsh GL, Rice DC.	Evaluate results after ERAS implementation in patients undergoing resection for pulmonary malignancy.	Retrospective Review.	They compared the results of patients undergoing pulmonary resection for primary lung cancer.	A total of 2,886 pulmonary resections were analyzed. For all patients, the length of hospitalization, Pulmonary complications were, and Cardiac complications decreased. There were no differences in hospital readmission.
Physical Therapist–Established Intensive Care Unit Early Mobilization Program: Quality Improvement Project for Critical Care at the University of California San Francisco Medical Center	2014	Engel HJ, Tatebe s, Alonzo PB, Mustille RL, Rivera MJ.	Improvements in results have demonstrated the value and feasibility of an early mobilization program conducted by physiotherapists	Study of Retrospective	An interprofessional early ICU mobilization group established and promoted guidelines for mobilizing ICU patients.	From 2009 to 2010, the number of patients undergoing physiotherapy treatment in the ICU increased from 179 to 294. The average times (interquartile intervals) of ICU admission to the physiotherapy assessment were 3 days (9 days) in 2009 and 1 day (2 days.) in 2010. The length of stay in the ICU decreased by an average of 2 days, and the percentage of outpatients discharged from home increased from 55% to 77%.
Thromboprophylaxis and Major Oncologic Surgery Performed With Epidural Analgesia	2013	Shouhed D, Amersi F, Sibert T, Sibert K, Hemaya E, Silbermam AW.	To evaluate clinical outcomes in patients with cancer who underwent major abdominal surgeries that received	Retrospective analysis of a prospective database	Between January 1, 2009 and July 31, 2011, 119 patients, with a mean age of 64.5 years (range 34 to years), underwent major	The average operative time was 338 minutes. The average stay in the intensive care unit (PD) was 2.8 (1.4) days. (range: 1-7 days). Postoperative outpatients

Search	Date	Author (es)	Objective	Method	Sample	Results
Delayed Mobilization After Microsurgical Reconstruction: An Independent Risk Factor for Pneumonia	2013	Yeung JK, Harrop R, McCreary O, Leung LT, Hirani N, McKenzia D, De Haas V, Matthews W, Nakoneshny S, Dort JC, Schrag C.	preoperative epidural catheters (ECs) and without postoperative thromboprophylaxis To determine the incidence of pneumonia among patients undergoing mouth cancer resection and immediate free flap reconstruction and to compare the incidence of this complication early mobilized patients (<4 days postoperatively) versus later.	Retrospective cohort study.	abdominal cancer surgery with a resident EC Sixty-two consecutive patients treated between 2005 and 2009 with resection of oral carcinoma and free flap. Information regarding comorbidities, postoperative care and complications was collected.	day 1 or 2. Most ECs were removed on the postoperative day 4. There were no major complications of EC. The incidence of pneumonia was 30.6%. Longer stay in the intensive care unit, tracheostomy decannulation after 10 days and longer operative times. Were significantly associated with pneumonia. Delayed mobilization (after day 4 postoperatively) was an independent risk factor for pneumonia.
Current practices of mobilization, analgesia, relaxants and sedation in Indian ICUs: a survey conducted by the Indian Society of Intensive Care Medicine	2014	Chawla R, Myatra SN, Dash SK.	Compare the incidence of complication early mobilized patients (<4 days postoperatively) versus later.	National web-based search.	A questionnaire included questions on demographic data, assessment scales for delirium, sedation and pain, as well as pharmacological agents and methods of practice.	Most respondents were aware of the benefits of early mobilization, but lack of support staff and security concerns were major obstacles to their implementation.
Mobilization in the Intensive Care Unit: systematic review	2014	Silva VS, Pinto JG, Martinez BP, Camelier FWR.	Systematize the knowledge about PM in the intensive care environment and its repercussion, especially on the functional and permanence aspects of mechanical ventilation (MV) and the ICU.	Systematic review	Only clinical trials with Control Group (CG) and full access availability were included, which evaluated the effect of PM on the ICU in adult humans over 18 years.	Early mobilization in the Intensive Care Unit had a significantly positive impact on patients' functional outcomes.
Effects of motor physical therapy in critically ill patients: literature review	2010	Da Silva APP, Maynard K, Da Cruz MR.	Review the literature related to the use of kinesiotherapy in intensive care unit patients	Literature review	Through the MedLine, LILACS, CINAHL, Cochrane, High Wire Press and SciELO electronic databases from January 1998 to July 2009 and book chapters using keywords including: critical illness, kinesiotherapy, physiotherapy, exercises, training, force, active mobilization, mobilization, ICU, rehabilitation, mobility, uscle strength ”and“ weakness	Despite the scarcity of studies and the methodological diversity of studies showing the use of kinesiotherapy as a therapeutic resource, its use, even early seems to be an alternative to the prevention and reversal of muscle weakness acquired in the intensive care unit.
Early intervention (mobilization or active exercise) for critically ill adults in the intensive care unit (Review)	2018	Doiron KA, Hoffmann TC, Beller EM	To evaluate the effects of early intervention (mobilization or active exercise) initiated in the ICU, provided to critical adults during or after the period of mechanical ventilation, compared with late exercise or usual care, on improving physical function or performance, strength muscle and health-related quality of life.	Study Systematic Reviews	Data collection and analysis Two researchers independently selected titles and abstracts and evaluated full-text articles based on the inclusion criteria of this review. We resolve any disagreement by discussing with a third reviewer as needed.	There were mixed results on the effect of early movement or exercise on function. One study found that in some measures of physical function, participants who received the intervention could get out of bed earlier and walk greater distances. Early movement or exercise seems safe because the number of adverse events was very low. There was no difference between the groups. time spent in hospital, muscle strength or mortality rates

4. Discussion

According to Murakami FM *et al*, technological advances and care for critically ill patients contribute to a high prevalence of patients who responded to early mobilization, and the clinical or surgical diagnosis does not interfere with the response of these patients, significantly contributing to decreased mortality, increased patient survival, which is of interest in always improving the adverse effects of immobility [2]. According to De Matos CA *et al*, there is a positive response related to patient survival and lower mortality rate with early mobilization interventions in intensive care units [1].

From Almeida EPM *et al* and Shouhed D *et al*, evidence that a postoperative early mobilization program seems to be safe and viable, working with exercises that improve fatigue, improve quality of life, increase muscle strength and decrease the incidence of clot formation.

Therefore in his study no clear clinical results were found [6, 10]. As stated by Thomas AJ *et al*, that physiotherapy conducts early rehabilitation as a component of ICU management, shows concern about the effectiveness of interventions provided beyond routine care, with this as a significantly positive response [7].

Silva VS *et al*, show that the frequency and severity of neuromuscular weakness and its clinical manifestations can be minimized by the application of early mobilization (MP) that acts in the prevention and treatment of these complications. Early physical therapy, even during the time of intubation and ventilatory support, can be safely practiced, improving patient functional outcomes [13].

Corner EJ *et al*, concluded through a survey of the patient's experience of early mobilization in the ICU that patients agreed with the relevance of early mobilization but found it difficult, tiring and uncomfortable [3].

Warren ML *et al* and Haren RMV *et al* present that mobilization activities performed by physiotherapists have increased, bringing the benefit of reduced time in an intensive care unit [4, 8]. For Weeks A *et al*, evidence that the functionality and quality of life of critically ill patients worsen when admitted to the ICU, but the study indicates that there must be cognitive and physical interventions as they are potentially viable in cancer patients to treat the limitation of functional performance [5].

Chawla R *et al* stated that most physicians are aware of the gains that mobilization brings to the patient, but their implementation is still limited due to lack of support and concern for their safety, and that mobilization depends on sedation-analgesia and ICU muscle rest [12]. Already Yeung JK *et al*, reported that several microsurgeons resist adopting mobilization protocols due to possible complications such as graft loss and skin discontinuation, so prefer to avoid [11].

For Silva AP *et al*, the exercises have well-stipulated physical and psychological gains, also reduce oxidative stress and inflammation, by providing the growth of anti-

inflammatory cytokines production [14].

According to Doiron KA *et al*, patients admitted to the intensive care unit require greater stabilization and monitoring attention, however, to be effective early mobilization has to take into account the type of exercise, frequency that is applied and dose and duration in these critically ill patients [15]. However, Engel HJ *et al*, says how favorable is the role of the physiotherapist in this early intervention in patient health, preventing changes and improving quality of life while in the ICU, thus promoting the rehabilitation of cancer patients [9].

5. Final Considerations

According to the analysis of the data obtained through this systematic literature review, it is noted that early ICU mobilization is highly effective in addressing the multidisciplinary team on cognitive, physical and functional aspects along with kinesio therapeutic progressivity appropriate to the individual needs of patients, providing significant benefits in preventing dysfunctions caused by the immobility syndrome, resulting in a better quality of life for the patient.

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